WHAT IS CLAIMED IS:

1.   A method for allocating bandwidth of a data network to a plurality
of data streams, comprising:

    specifying apportionment of the bandwidth to a plurality of data classes;

    receiving a plurality of data streams wherein each data stream has at least
one attribute that associates the data stream with one of the data classes;

    negotiating a transfer rate for each data stream, wherein the transfer rate is
limited to the bandwidth apportioned to the data class associated with each data stream;
and

    transmitting the data streams on the data network at the negotiated transfer
rates.

2.   The method of claim 1 wherein the step of receiving comprises
steps of:

    receiving stream annotations associated with each of the data streams; and

    activating a plug-in to receive each data stream, wherein the type of plug-
in is determined from the stream annotations.

3.   The method of claim 1 wherein the step of negotiating comprises
steps of:

    determining a plurality of acceptable transmission rates for each data
stream; and

    negotiating a transfer rate for each data stream, wherein the transfer rate is
a selected one of the acceptable transmission rates and is limited to the bandwidth
apportioned to the data class associated with each data stream.

4.   The method of claim 1 wherein the step of transmitting comprises
steps of:

    transforming each data stream to the negotiated transfer rate; and

    transmitting the data streams on the data network at the negotiated transfer
rates.

5.   The method of claim 4 wherein the step of transforming comprises
a step of thinning, transcoding or decimating the data stream to the negotiated transfer

3 rate.

1   6.   The method of claim 1 wherein the transfer rate is a first transfer

2 rate and the method further comprises steps of:

3   determining unallocated bandwidth on the data network;

4   negotiating a second transfer rate for at least one data stream, wherein the

5 second transfer rate uses the unallocated bandwidth;

6   transforming the at least one data stream to the negotiated second transfer

7 rate; and

8   transmitting the at least one data stream on the data network at the second

9 transfer rate.

1   7.   The method of claim 6 further comprises steps of:

2   receiving at least a second data stream having an associated data class;

3   negotiating a third transfer rate for the at least one data stream, wherein the

4 third transfer rate is limited to the bandwidth apportioned to the data class associated with

5 the at least one data stream;

6   negotiating a fourth transfer rate for the at least second data stream,

7 wherein the fourth transfer rate is limited to the bandwidth apportioned to the data class

8 associated with the at least second data stream; and

9   transmitting on the data network, the at least one data stream at the third

10 transfer rate and the at least a second data stream at the fourth data rate.

1   8.   Apparatus for allocating the bandwidth of a data network to a data

2 stream having an associated data class, the apparatus comprising:

3   a stream processor, having logic to receive the data stream and to

4 determine a plurality of acceptable transmission rates for the data stream;

5   an allocator, coupled to the stream processor and having logic to negotiate

6 a transfer rate for the data stream with the stream processor, wherein the transfer rate is a

7 selected one of the plurality of acceptable transmission rates and is limited to a portion of

8 the bandwidth apportioned to the data class associated the data stream; and

9   an output coupled to the stream processor, having logic to receive the data

10 stream and transmit the data stream on the data network at the negotiated transfer rate.

1   9.   The apparatus of claim 8 further comprising a manager having

2   logic to activate the stream processor based on stream annotations associated with the

3   data stream.

1   10.   The stream processor of claim 8 further comprising a transformer

2   having logic to transform the data stream to the negotiated transfer rate.

1   11.   The allocator of claim 8 further comprising bandwidth allocations,

2   wherein the bandwidth allocations apportion the bandwidth to a plurality of data classes.

1   12.   The apparatus of claim 8 wherein the allocator further comprises a

2   detector having logic to detect unallocated bandwidth on the data network and logic to

3   negotiate with the stream processor a new transfer rate for the data stream that is a

4   selected one of the plurality of acceptable transmission rates, wherein the new transfer

5   rate utilizes at least a portion of the unallocated bandwidth.

1   13.   The apparatus of claim 8 wherein the stream processor further

2   comprises logic to determine a new plurality of acceptable transmission rates for the data

3   stream based on changes to the data stream.

1   14.   A method of operating a data network to allocate bandwidth of the

2   data network to a data stream, comprising:

3   annotating the data stream with stream annotations;

4   transmitting the data stream on the data network;

5   establishing a policy tree that specifies apportionment of the bandwidth of

6   the data network to a plurality of data classes;

7   receiving the data stream;

8   determining a plurality of acceptable transmission rates for the data

9   stream;

10   negotiating a transfer rate for the data stream, wherein the transfer rate is a

11   selected one of the acceptable transmission rates and is limited to the bandwidth specified

12   by the policy tree for the data class associated with the stream annotations of the data

13   stream;

14   transforming the data stream to the negotiated transfer rate; and

15   transmitting the data stream on the data network at the negotiated transfer

16   rate.

1   15.   The method of claim 14 wherein the step of determining comprises

2 steps of:

3   receiving the stream annotations of the data stream; and

4   activating a stream processor based on the stream annotations to receive

5 the data stream and to determine the plurality of acceptable transmission rates for the data

6 stream.

1   16.   The method of claim 14 wherein the transfer rate is a first transfer

2 rate and the method further comprises steps of:

3   determining unallocated bandwidth on the data network;

4   negotiating a second transfer rate for the data stream, wherein the second

5 transfer rate is a selected one of the plurality of acceptable transmission rates and uses at

6 least a portion of the unallocated bandwidth;

7   transforming the data stream to the negotiated second transfer rate; and

8   transmitting the data stream on the data network at the negotiated second

9 transfer rate.

1   17.   The method of claim 16 wherein the data stream is a first data

2 stream, the stream annotations are first stream annotations and the data class is a first data

3 class, the method further comprises steps of:

4   annotating a second data stream with second stream annotations;

5   determining a plurality of acceptable transmission rates for the second data

6 stream;

7   negotiating a first transfer rate for the first data stream, wherein the first

8 transfer rate is a selected one of the acceptable transmission rates for the first data stream

9 and is limited to the bandwidth specified by the policy tree for the data class associated

10 with the first data stream;

11   negotiating a second transfer rate for the second data stream, wherein the

12 second transfer rate is a selected one of the acceptable transmission rates for the second

13 data stream and is limited to the bandwidth specified by the policy tree for the data class

14 associated with the second data stream;

15   transforming the first data stream to the negotiated first transfer rate and

16 the second data stream to the negotiated second transfer rate; and

17   transmitting the first data stream and the second data stream on the data

18   network at the negotiated transfer rates.

1   18.   A data network for transmitting a data stream, comprising:

2   a first node having logic to annotate the data stream with stream

3   annotations that define a data class and having logic to transmit the data stream and the

4   stream annotations on the data network;

5   a second node couple to the first node and having logic to receive the data

6   stream and the stream annotations;

7   a stream processor coupled to the second node having logic to receive the

8   data stream and determine a plurality of acceptable transmission rates;

9   an allocator coupled to the stream processor, the allocator having a policy

10   tree that specifies apportionment of a bandwidth of the data network to a plurality of data

11   classes, and wherein the allocator further comprises logic to negotiate a transfer rate for

12   the data stream wherein the transfer rate is a selected one of the plurality of acceptable

13   transmission rates and is limited to the bandwidth allocated by the policy tree to the data

14   class defined by the stream annotations;

15   an output coupled to the stream processor and having logic to transmit the

16   data stream on the data network at the negotiated transfer rate; and

17   a third node couple to the second node and having logic to receive the data

18   stream transmitted by the output.

1   19.   The stream processor of claim 18 further comprising logic to

2   transform the data stream to the negotiated transfer rate.

1   20.   The allocator of claim 18 further comprising a detector having

2   logic to detect unallocated bandwidth of the data network and wherein upon detected

3   unallocated bandwidth, the detector has logic to activate negotiation for a new transfer

4   rate for the data stream, wherein the new transfer rate is a selected one of the plurality of

5   acceptable transmission rates that uses at least a portion of the unallocated bandwidth.